

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re application of:

Ephraim GUTMARK *et al.*

Application No.: **10/725,562**

Filing Date: 3 December 2003

For: Method for Affecting Thermoacoustic Oscillations  
in Combustion Systems

Art Unit: 3749

Examiner: Basichas, Alfred

Attorney Ref. No.: 003-102

**Via EFS-Web**

**REPLY BRIEF FOR APPELLANT**

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Commissioner for Patents

P.O. Box 1450

Alexandria, VA 22313-1450

Sir:

COMES NOW APPELLANT to present this Reply Brief in support of the appeal of the second rejection of Claims 1-8 and 16 in the above-captioned patent application. The Examiner's Answer having been electronically transmitted on 13 December 2007, this Reply Brief is due to be filed by 13 February 2008. 37 C.F.R. § 41.41(a)(1).

For the following additional reasons, Appellant respectfully submits that the final rejection of each of Claims 1-8 and 16 in this application is in error, and therefore respectfully requests reversal of the rejections.

## **ARGUMENTS**

Appellant has, in the Appeal Brief filed 5 July 2007, as supplemented on 6 September 2007, addressed all of the rejections of the claims. Appellant addresses below the specific additional comments presented in the Examiner's Answer.

### *Rejection of Claims 1, 6, and 16*

The Examiner's Answer does not contain any explanation or support for the rejections of Claims 1, 6, and 16, other than to allege that, "the reference anticipates the claimed method given its broadest reasonable reading." Consistent with the prior treatment of the claims, the Examiner's Answer does not explain what that "reading" is and, therefore, how *Gutmark* allegedly anticipates the subject matters of these claims.

### *Rejection of Claims 2 and 3*

The Examiner's Answer attempts to justify the rejection of Claims 2 and 3 based on an absurd interpretation of the term "modulate", in which the term also allegedly means "at a constant rate". Notably, the gerund "modulating" is in Claim 1, yet has been ignored in the Examiner's Answer as it was during prosecution of the application. Mr. Basichas cites to the Merriam Webster Online Dictionary, without first reference to the specification, to support this distortion of the claim language. M.P.E.P. § 2111, quoting *Phillips v. AWH Corp.*, 415 F.3d 1303, 75 USPQ2d 1321 (Fed. Cir. 2005), plainly requires that, "[d]uring patent examination, the pending claims must be 'given their broadest reasonable interpretation consistent with the specification.'" The M.P.E.P. thus makes abundantly clear the instruction to the examining corps that the first inquiry, concerning a claim term, is to be made to the application's specification, to ascertain how the claim term is used in the context of the application; only after that inspection of the 'intrinsic evidence' of the application, can the patent examiner look to dictionaries and the like. But, in no instances can a "reasonable interpretation" of a claim term be one that is inconsistent with the use of the term by the application's specification.

On examination of this specification, Claims 2 and 3 find basis in at least the following extract:

“In accordance with an advantageous development, the injection of the total quantity of fuel can be carried out in such a way that a first quantity of fuel is injected at a constant rate, while a second quantity of fuel is injected in a modulated manner. This procedure ensures, firstly, that the combustible mixture in the combustor does not become excessively lean, in order to avoid extinguishing the flames. Secondly, this procedure makes use of the finding that the use of a (relatively small) quantity of the injected fuel is sufficient to achieve the desired influence on the thermoacoustic oscillations, as a result of the modulated injection. Since, therefore, only part of the fuel has to be injected in a modulated manner, the fuel supply device constructed for this purpose can be dimensioned correspondingly smaller.” (page 3, lines 24-39)

Adopting the definition of ‘modulate’ argued by Mr. Basichas creates an absurd construction: the specification would at the same time differentiate between ‘modulated’ and ‘constant rate’ fuel injection, while simultaneously saying that they are identical. The foregoing passage is but one of many throughout the specification which would become nonsensical, were Mr. Basichas’ interpretation of ‘modulate’ be reasonable. Appellant notes that no objection to the specification was ever made, that it makes no sense, and yet Mr. Basichas attempts to foist onto this application a meaning of a claim term which would render much of the application and claims gibberish. Appellant respectfully submits that a person of ordinary skill in the art, upon a full and fair reading of this application, fully understands that the term ‘modulate’, and its several other forms, does not include “at a constant rate”.

### *Rejection of Claim 5*

The Examiner’s Answer plainly confuses the subject matters of Claims 5 and 6, both of which are mentioned in this section. Claim 5 requires, *inter alia*, that fuel injection is performed independently of an oscillation phase of the oscillations; Claim 6 requires, *inter alia*, that modulating fuel injection is coupled to an oscillation phase of the thermoacoustic oscillations.

Thus, the Examiner's Answer confuses the record, because it appears to treat "independently of an oscillation phase" from Claim 5 the same as "couple to an oscillation phase" from Claim 6.

Regardless of which claim Mr. Basichas attempted to address, col. 3, lines 15-30, of *Gutmark* say nothing about the subject matter of either:

Thus, for a 50% suppression in pressure fluctuation amplitude, the loudspeaker should supply a power of 75% of the acoustic power measured in the combustion chamber, if one would rely on anti-sound principles. Driving the loudspeakers at a power of  $P=100$  W (Watts) and assuming a 10% efficiency of the loudspeaker, the power fed into the combustion chamber is only 0.6% of the suppressed power. As a further driving mechanism, flame and fluid flow dynamics in the combustion chamber, in particular thermoacoustic instabilities, can also be induced by changes in equivalence ratio. However, a comparison between the estimated OH change during one cycle of oscillation and the measured value showed that the driving mechanism which is initiated by the equivalence ratio (e.g. by fuel injection modulation) only plays a secondary role to the main mechanism related to flow instabilities.

This passage, indeed all of *Gutmark*, is silent about fuel injection being performed independently of an oscillation phase of the oscillations, or modulating fuel injection coupled to an oscillation phase of the thermoacoustic oscillations.

#### *Rejection of Claim 7*

In alleging that the rejection of Claim 7 is proper, Mr. Basichas asserts that fig. 1A of *Gutmark* implicitly anticipates the claim, as "[f]low modulation would be occur [sic] in the early stage of injection as shown at the left hand side of the figure, which also includes a shear layer". Fig 1A shows velocity profiles and the location of shear layers; however, there is no indication in *Gutmark* that the presence of either equates to the presence of flow modulation. Instead, *Gutmark* teaches at column 2, line 10-19, that shear layers:

are present in the mixing zones of two different fluid flows but also within one fluid flow when there are regions with changing or different velocities adjacent to each other, as e.g. in the center of a swirl flow or in the boundary layers of a fluid flow adjacent to a wall. The most relevant shear layers in the context of this invention are the boundary layers

between two air-fuel-flows or between an air-fuel-flow and a (recirculating) exhaust gas flow.

The person of ordinary skill in the art would recognize that shear layers and velocity profiles can and do exist without flow modulation, as none of the described factors are unique to flow modulation. Therefore, the assertion that Fig 1A anticipates Claim 7 finds no basis in *Gutmark* and so the rejection of the claim is unfounded.

#### *Rejection of Claim 8*

The Examiner's Answer does not contain any explanation or support for the rejections of Claim 8, other than to state that, "given the broadness of the claimed recitation, it is believed to be at least implicitly anticipated." Consistent with the prior treatment of the claims, the Examiner's Answer does not explain how the claim's subject matter would, with an actual reasonable interpretation of what the claim terms mean, be "implicitly anticipated" by *Gutmark*, *e.g.*, with an explanation of the underlying physics and fluid mechanics which would necessarily result in the performance of the method recited in the Claim. M.P.E.P. § 2112.02.

*Conclusion*

For at least the reasons presented herein and in the Appeal Brief, each of the subject matters of Claims 1-8 and 16, each taken as a whole, is patentable over *Gutmark*. Accordingly, the rejection of each of Claims 1-8 and 16 under sections 102 and 103 is reversible error.

Respectfully submitted,

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